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(54) Packaging

(57) Packaging formed with a tear-off strip comprises a sheet 2 foldable or rollable to provide a packaging tube 4. The sheet 2 is manufactured from a plastics film having a thickness of between 200 and 500 microns and is formed with two substantially parallel lengths of perforations 8 to define the tear-off strip. The perforations 8 may be formed by a heated die.

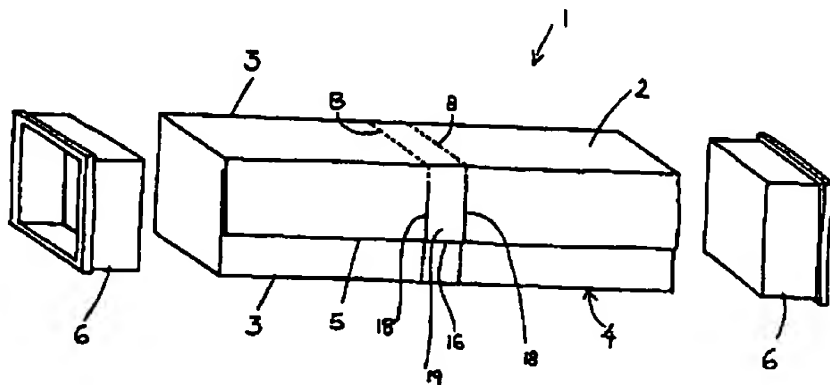


Figure 1

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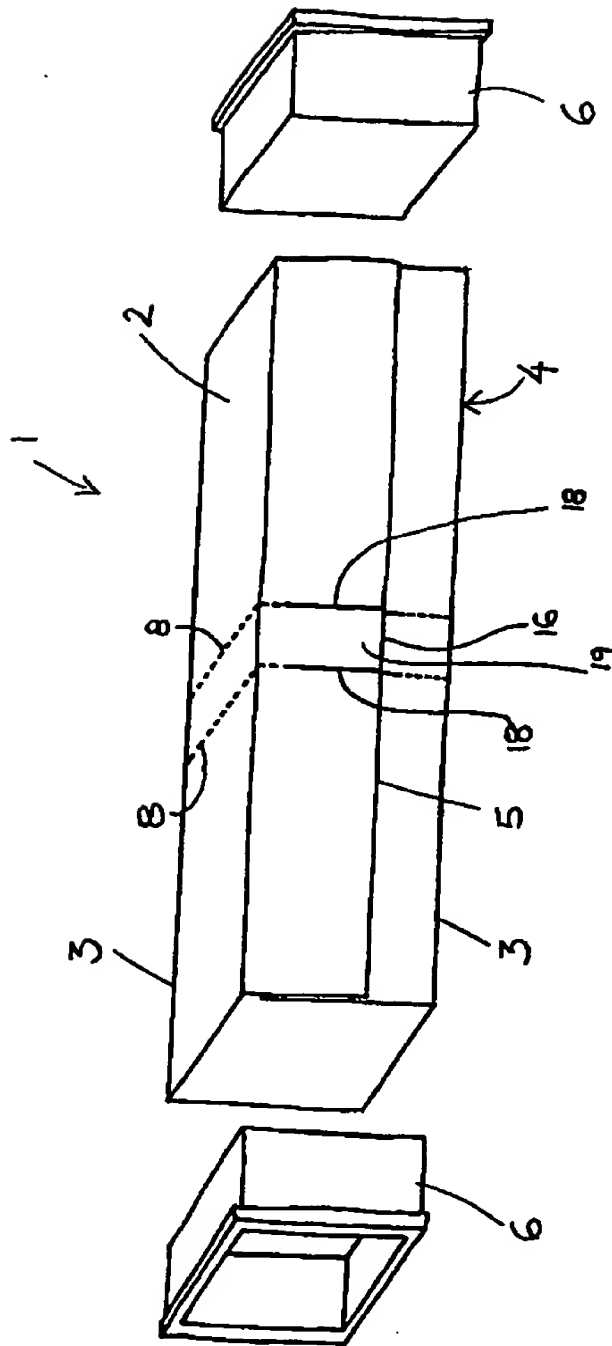


Figure 1

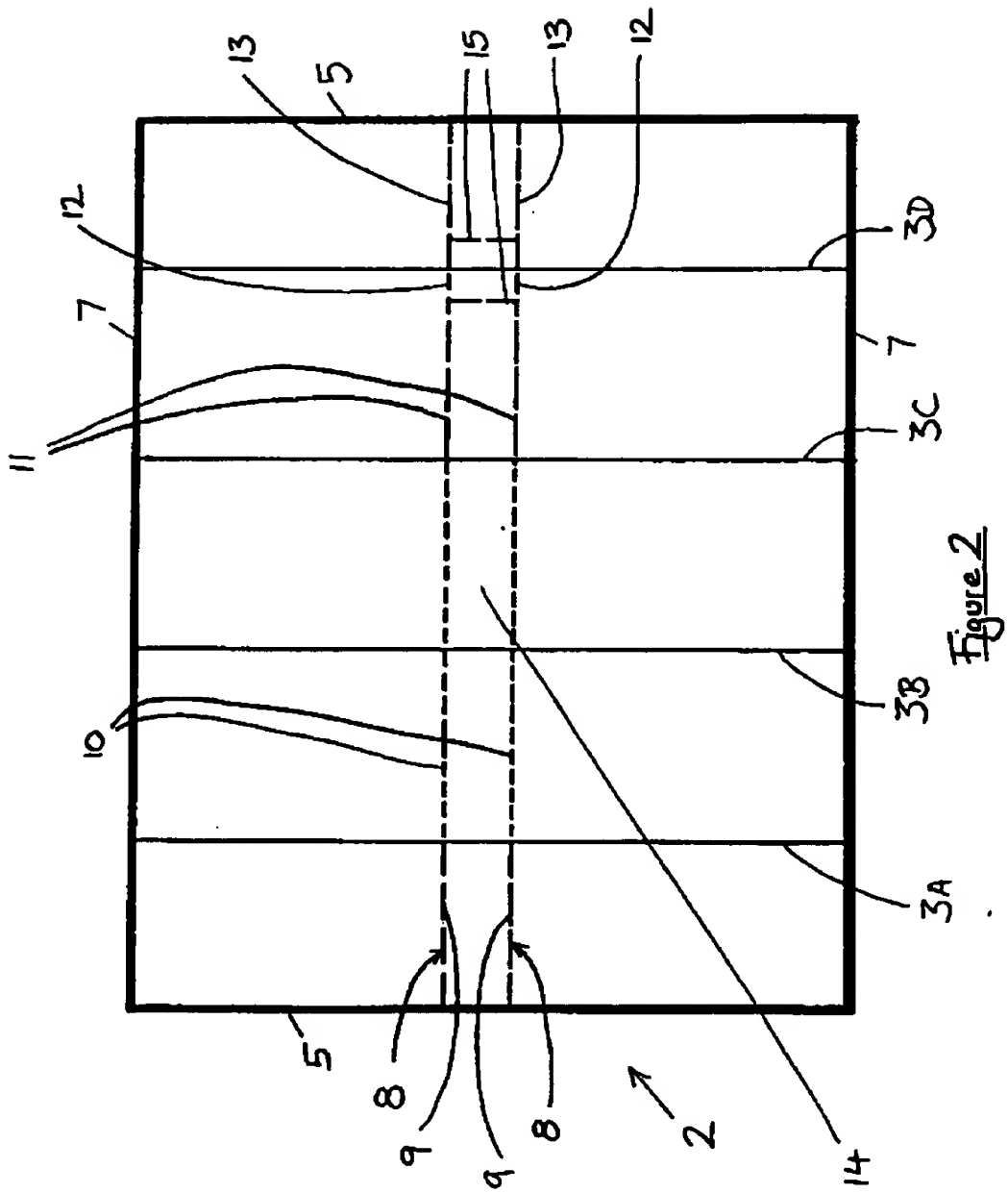


Figure 2

PATENTS ACT 1977

P10252GB-ALM/LH/vt

"Packaging and a method of manufacturing packaging"

This invention relates to packaging and a method of manufacturing packaging. More particularly, the invention relates to plastics packages and a method of manufacturing the same.

For security and in some cases hygiene reasons, plastics packaging for products on sale in, for example, supermarkets, superstores and the like has conventionally been sealed by the use of heavy metal staples to prevent the product from being handled or used by prospective purchasers. However, once a product has been bought, the purchaser must remove these heavy metal staples. This is a time consuming and awkward practice which has led to complaints concerning this method of sealing packaging. One aspect of this invention seeks to provide a more convenient means of gaining access to the contents of plastics packaging.

Accordingly, one aspect of the present invention provides a package formed with a tear-off strip comprising a sheet foldable or rollable to provide a body of the package, which sheet is manufactured from a plastics film having a thickness of between 200 and 500 microns and is formed with two substantially parallel lines of perforations extending over the sheet, the portion of sheet between the lines of perforations comprising a tear-off strip.

A problem associated with the manufacture of plastics packaging is that stamping machines which provide creases and perforations in the plastics packaging cause the plastics (such as (U)PVC) to crystallise and/or become

embrittled and hence weak in the areas proximate the crease or perforation.

A further aspect of this invention seeks to provide a method of manufacture which does not suffer from the above-mentioned problems.

Thus, a further aspect of the present invention provides a method of manufacturing packaging comprising a packaging sheet with a tear-off strip from a plastics film having a thickness between 200 and 500 microns comprising the steps of: heating a die to a temperature sufficient to soften the film; punching the film with the die to form two substantially parallel lines of perforations extending over the sheet; maintaining the die in contact with the film for a predetermined dwell time; and removing the die.

In order that the present invention may be more readily understood, an embodiment thereof will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a package embodying the present invention; and

Figure 2 is a plan view of a blank in the form of a sheet for use in constructing the package of Figure 1.

Referring to Figure 1, a package 1 embodying the present invention comprises a blank in the form of a rectangular sheet 2 of plastics film material which has been folded along four parallel longitudinal crease lines 3 to form an elongate square tube 4. The longitudinal edges 5 of the sheet 2 overlap one another and are sealed together to maintain the shape of the square tubes 4.

A plastics injection-moulded end plug 6 is inserted in each open end of the square tube 4 to close and seal the tube at both ends.

The rectangular sheet 2 for forming the square tube is shown in more detail in Figure 2. Preferably, the sheet 2 is part of a continuous reel-to-reel sheet for manufacturing tubing. The edges 5,7 of the sheet 2 are shown in bold solid lines, creases or fold lines 3 in the sheet 2 are shown by thin solid lines, pre-cut lines in the sheet 2 are shown by long dashes and perforations are shown by short dashes.

Referring to Figure 2, four substantially equally spaced parallel crease lines 3 are made which extend from one lateral edge 7 of the sheet 2 to the opposite edge 7. The crease lines 3 allow the sheet to be folded through 90° along each crease line 3 so that one longitudinal edge 5 of the sheet 2 overlaps the other. The crease lines 3 are preferably made continuously by revolving crease wheels whilst the sheet 2 is being rolled off from a reel.

The sheet 2 is also provided with two parallel spaced apart cut and perforation lines 8 which extend from one longitudinal edge 5 of the sheet to the other. As shown in Figure 2, the cut and perforation lines are normal to the crease lines 3. Each cut and perforation line 8 consists, sequentially, of a length of pre-cut sheet 9, a length of perforated sheet 10, a length of pre-cut sheet 11, a final length of perforated sheet 12 and a final length of pre-cut sheet 13. The portion of sheet 2 between the cut and perforation lines 8 comprises a tear-off strip 14. Preferably, the cut and perforation lines 8 are formed on the tube 4 whilst the tube 4 is in its finished and folded condition as shown in Figure 1. By providing the

cut and perforation lines 8, after the sheet 2 has been formed into the tube 4, one ensures that the tear-off strip 14 is in an appropriate position along the length of the tube 4 and that all the cut and perforation lines 8 register with one another. Alternatively, the cut and perforation lines 8 are provided in the sheet 2 before it is folded into the tube 4. Figure 2 illustrates such an arrangement but also serves to illustrate clearly the relative positions of the different lengths of time cut and perforation lines 8.

It is advantageous to provide the cut and perforation lines 8 in the tube 4 since if such lines 8 were formed in the sheet 2, there would be a tendency for the tear-off strip 14 to tear due to the stresses in the manufacturing process. Further the sheet 2 would be travelling too quickly during the process for suitable perforations to be made.

The first length of pre-cut sheet 9 extends from one longitudinal edge 5 of the sheet to just short of the first crease line 3A. The following length of perforated sheet 10 extends from the end of the length of pre-cut sheet 9 over the first crease line 3A, over the second crease line 3B, over the third crease line 3C and terminates shortly after the third crease line 3C. The following length of pre-cut sheet 11 extends from the end of the previous length of perforated sheet 10 to just short of the last crease line 3D where a short length of perforated sheet 12 extends over the last crease line 3D and terminates in the final length of pre-cut sheet 13 which extends from just over the fourth crease line 3D to the other longitudinal edge 5.

The sheet 2 is also pre-cut in two places parallel to the crease lines 3 from one cut and perforation line 8 to the other immediately adjacent either side of the final length of perforated sheet 12.

The sheet 2 is folded so that one longitudinal edge 5 overlaps the others and one of the two pre-cut lengths 9 of sheet at the longitudinal edge 5 overlaps and registers with the other. In this position, the one longitudinal edge 5 of the sheet 2 is parallel and adjacent to the length of pre-cut sheet 15 extending from the one cut and perforation line 8 to the other. This arrangement provides a slit 16 in the square tube 4 and provides the means by which the package 1 can be opened. The overlying pre-cut lengths 9,13 of sheet form one end of the tear-off strip 14 and provide starter cuts 18 which may be manually lifted and peeled from the tube 2 with little effort to start tearing the strip 14 from the sheet. Once the end of the tear-off strip 14 is pulled from the sheet, it provides a finger tab portion 19 of sheet which is then pulled so that the adjacent perforations in the sheet are broken and the entire tear-off strip 14 which encircles the tube 4 may be torn away from the tube 4 thereby opening the package.

Preferably, the two longitudinal edges 5 of the sheet are glued or welded to one another using a solvent adhesive which softens the sheet surfaces which are pressed together and form a weld when the solvent evaporates. Alternatively, the two longitudinal edges 5 may be sealed to one another by a heat sealing process.

The end plugs 6 may be sealed on the tube 4 either by heat sealing or by stapling the end plugs to the tube 4.

The preferred materials for the plastics sheet 2 comprise a transparent plastics foil such as a so-called rigid vinyl film such as a PET film, a cellulose acetate film, a styrene film or an unplasticised PVC film, (U)PVC. The (U)PVC film has a thickness of between 200 and 500 microns. The film is manufactured from a plastics material which has not had any plasticiser added during manufacture and is, therefore, unplasticised.

Tear-off polyethylene bags used in supermarkets for self selection of produce are manufactured using a process in which a thin film plastics material is perforated using a cold toothed knife which is attached to a bar containing a welding strip so that a perforated length, produced by the cold toothed knife, and a parallel welded length are formed simultaneously.

The perforation of thin film plastics materials is widely used since the material is soft and easily punched or perforated. The punching and perforation of thicker films, especially (U)PVC films is problematic since the impact necessary to crease, punch or perforate the film also embrittles the film. Cold stamping (U)PVC films embrittles the film and does not result in satisfactory packaging.

A method of manufacturing packaging embodying the present invention involves using heated dies which, under pressure, cut through the film without embrittling the film. Care needs to be taken not to overheat the film or to allow too long a contact (dwell) time between the heated die and the film so as to avoid crystallising and embrittling the film.

Successful results have been achieved using a die heated to 150°C. with a dwell time of between 0.9 and 1.1 seconds, the dwell time depending on the film thickness. The die pressure is in the region of 4.5 tonnes. To produce perforations, a toothed tool steel blade set in Tufnol (Trade Mark) is used. For punching, a plain tool steel blade set in Tufnol (Trade Mark) is used.

It is also envisaged that a pair of lines of perforations may be formed along the length of the package 1 from one lateral edge 7 to the other 7 rather than running normal to the crease lines 3 of the package 1.

The packaging described above has a square section. By using an appropriate number of crease lines, other shapes of tubing can be produced. For example, two crease lines would provide a substantially flat package; six crease lines would provide a package of hexagonal section; and no crease lines would provide a package of oval or cylindrical section.

CLAIMS

1. Packaging formed with a tear-off strip comprising a sheet foldable or rollable to provide a packaging tube, which sheet is manufactured from a plastics film having a thickness of between 200 and 500 microns and which is formed with two substantially parallel lengths of perforations extending over the sheet, the portion of sheet between the lengths of perforations comprising a tear-off strip.
2. Packaging according to Claim 1, wherein the lengths of perforations extend across the sheet from one side of the sheet to another side.
3. Packaging according to Claim 1, wherein the lengths of the perforations terminate short of the sides of the sheet and length of pre-cut sheet extend from the ends of the lengths of the perforations to the respective side of the sheet to form a starter cut for the tear-off strip.
4. Packaging according to Claim 1 or 3, wherein a length of perforations is interrupted by a length of pre-cut sheet.
5. Packaging according to any preceding claim, wherein at least one length of pre-cut sheet is formed which extends from one length of perforations to the other length of perforations.
6. Packaging according to any preceding claim, wherein the sheet is rolled or folded such that one side of the sheet overlaps an opposite side, the overlapping portions being fastened to one another thereby forming the tube.

7. Packaging according to Claim 6, wherein the sheet is formed with at least one crease line extending from one side of the sheet to another.
8. Packaging according to Claim 7, wherein the number of crease lines dictate the shape of the packaging.
9. Packaging according to Claim 7 or 8, wherein the sheet is rectangular and formed with four equally spaced and parallel crease lines so that, when folded along the crease lines, a square tube is produced.
10. Packaging according to any one of Claims 1 to 6, wherein no crease lines are provided.
11. Packaging according to any preceding claim, wherein the lengths of perforations run normal to the central axis of the tube.
12. Packaging according to any one of Claims 1 to 10, wherein the lengths of perforations run parallel to the central axis of the tube.
13. Packaging according to any preceding claim, wherein means are provided to close the open ends of the tube.
14. A method of manufacturing a packaging blank with a tear-off strip from a plastics film having a thickness between 200 and 500 microns comprising the steps of: heating a die to a temperature sufficient to soften the film; punching the film with the die to form two substantially parallel lengths of perforations extending over the sheet; maintaining the die in contact with the film for a predetermined dwell time; and removing the die.

15. A method according to Claim 14, wherein the package is folded or rolled into a tube before the film is punched.

16. A method according to Claim 14 or 15, wherein the die is raised to a temperature in the region of 150°C.

17. A method according to any one of Claims 14 to 16, wherein the die is kept in contact with the film for between 0.9 and 1.1 seconds.

18. Packaging substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

19. A method substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

20. Any novel feature or combination of features disclosed herein.



The Patent Office

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Application No: GB 9523994.3
Claims searched: 1 to 19

Examiner: Mike Henderson
Date of search: 2 October 1996

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): B5D (DP DSS1) B8C (CWS6) B8P(PG1 PK4 PK14)

Int Cl (Ed.6): B31B 1/14 1/16 1/20 B65D 3/26 5/54

Other: ONLINE:WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	GB 2156303 A (NEUSIEDLER AG FUR PAPIERFABRIKATION (AUSTRIA)) (Whole specification relevant)	1 to 13 & 18
A	GB 732032 (ALGIDA INDUSTRIA ALIMENTI GELATI SARL) (Whole specification relevant)	1 to 13 & 18
A	US 4091929 (KRANE) (Whole specification relevant)	1 to 13 & 18

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.